Use the given pair of functions to find and simplify expressions for the following functions and state the domain of each using interval notation.

Exercise 1 *For* $f(x) = 3x^2 - 2x + 7$ *and* $g(x) = -x + 3$

- $(g \circ f)(x) = \boxed{-3x^2 + 2x - 4}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{3x^2 - 20x + 28}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{27x^4 - 36x^3 + 132x^2 - 74x + 140}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 2 *For* $f(x) = x^2 - 9$ *and* $g(x) = |x|$

- $(g \circ f)(x) = \boxed{|x^2 - 9|}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{x^2 - 9}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{x^4 - 18x^2 + 72}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 3 *For* $f(x) = 4x + 3$ *and* $g(x) = -\sqrt{x}$

- $(g \circ f)(x) = \boxed{-\sqrt{4x + 3}}$ *with domain* $\left[\boxed{-\frac{3}{4}}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{-4\sqrt{x} + 3}$ *with domain* $\left[\boxed{0}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{16x + 15}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 4 *For* $f(x) = |x|$ *and* $g(x) = \sqrt{9 - x}$

- $(g \circ f)(x) = \boxed{\sqrt{9 - |x|}}$ *with domain* $\left[\boxed{-9}, \boxed{9}\right]$
- $(f \circ g)(x) = \boxed{|\sqrt{9 - x}|}$ *with domain* $\left(\boxed{-\infty}, \boxed{9}\right]$
- $(f \circ f)(x) = \boxed{|x|}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
